Update of the Best Practice Dietetic Management of Overweight and Obese Children and Adolescents: a Systematic Review Protocol

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Review objective

To update an existing systematic review series[1,2] of randomized controlled trials (RCT) that include a dietary intervention for the management of overweight or obesity in children or adolescents.

Research Questions

In RCTs of interventions which include a dietary intervention for the management of overweight or obesity in children or adolescents:

- what impact do these interventions have on participants' adiposity and dietary outcomes?
- what are the characteristics or intervention components that predict adiposity reduction or improvements in dietary outcomes?

Background

Over the past four decades overweight and obesity prevalence has increased globally in children.[3] Once considered a problem only in high-income countries, prevalence of overweight and obesity is increasing in low- and middle-income countries, particularly in urban settings. The magnitude of these changes are such that in 1980, 8% and 16% of children from developing and developed countries, respectively, were overweight (including obese), and by 2013 these rates had increased to around 13% and 23-24%, respectively.[3] At the upper-end of the weight spectrum, recent estimates suggest that worldwide in 2015, 107.7 million (~5%) children under 20 years of age were obese[4], and in 2016, 41 million (~6%) children under five years of age were classified as having moderate-severe overweight.[5]

Overweight, and especially obesity, in childhood is a significant public health issue due to its impact on health and quality of life in childhood[6] and its propensity to persist into adulthood.[7] Aside from the impact of overweight and obesity on individuals, its global economic impact is estimated to be in the order of trillions of dollars annually.[8] The health consequences of childhood overweight and obesity that may present in childhood include: delayed motor development, asthma, obstructive sleep apnoea, dysglycemia and type 2 diabetes, elevated blood pressure, dyslipidemia, chronic inflammation, muscular skeletal problems, accelerated maturation, psychological difficulties and disorders, non-alcoholic fatty liver disease, gastroenterological problems and reproductive problems.[6] In adults, overweight and obesity is associated with increased risk of all-cause mortality,[9,10] and the incidence of

numerous co-morbidities including type 2 diabetes, various types of cancer, cardiovascular diseases, asthma, gallbladder disease, osteoarthritis and chronic backpain.[11]

While prevention must remain the key focus for medical and public health communities responding to child and adolescent overweight and obesity, effective strategies are required for populations already affected. The cornerstone of managing child and adolescent overweight and obesity is family-centered, multicomponent lifestyle intervention based on dietary, physical activity and behavioral modification.[12,13] Lifestyle interventions can reduce body mass index (BMI), and improve other cardiometabolic outcomes including blood lipids, fasting insulin and glucose, and blood pressure in children and adults.[14-19]

In 2007 our original systematic review on best practice dietetic management of overweight and obese children and adolescents was published,[1] and the first update was published in 2013.[2] Data gathered in those reviews also formed the basis of several secondary reviews on related topics. [14-15, 20-22] This series of reviews has been widely cited in over 125 peer-reviewed publications. Given the prevalence of overweight and obesity in childhood remains at a historical high, and the seriousness of its consequences, a second update of our review on best practice dietetic management of overweight and obese children and adolescents is warranted. In parallel, a series of Cochrane reviews on interventions for the treatment of child and adolescent overweight and obesity management were published between 2003 and 2017, those reviews included but were not restricted to interventions that featured a dietary component. [23-30] There is some overlap between our series of reviews and the Cochrane review series with regards to the reporting of adiposity outcomes. However, the novel aspect of our primary systematic review and its update[1,2] is that we examine in detail the dietary outcomes of the included dietary interventions, and also the characteristics of these interventions which are associated with improvement in adiposity and dietary outcomes.

This second update of our review on best practice dietetic management of overweight and obese children and adolescents will provide key information to inform clinical practice guideline and policy development. It will also identify gaps in the evidence base requiring further research and potential areas where innovations in dietary management are needed to improve adiposity and dietary outcomes. This protocol is based on that used for the first update of this review.[31] The methods described in this protocol were guided by the Joanna Briggs Institute Reviewer's Manuals[32-33] and recommendations for updating systematic reviews.[34]

Keywords

Child; adolescent; dietary intervention; obesity; randomized controlled trial

Inclusion criteria

As this is an updated systematic review the inclusion criteria are based on the criteria used in our previous reviews[1,2] and which are specified in our previous protocol.[31]

Types of participants

This review will include interventions targeting children or adolescents who at baseline are less than 20 years of age, and who are defined as overweight or obese.

Participants will be free living outpatients or inpatients in obesity clinical units or attending community programs, camps, school or one-off programs. Interventions directed exclusively at parents of eligible participants will also be reviewed. Studies will be excluded if they focus on children or adolescents with obesity attributable to a secondary or syndromal cause with the exception of Type 2 Diabetes Mellitus or its precursor states.

Types of intervention

Nutrition or dietary interventions of interest will be those used for the treatment of elevated body weight. Interventions will include but not be limited to those provided by:

- a dietitian solely;
- a dietitian and other health professionals; or
- other professionals including obesity clinics, practice nurses, GPs, commercial programs, train-the-trainer, community groups, gyms, schools or via the internet, telephone or mail.

The intervention focus may be described as: lifestyle modification, including modification of dietary intake alone (inclusive of meal replacements and dietary supplements), or combined with cognitive behavioral therapy and/or physical activity and/or sedentary behavior modification and/or pharmacotherapy and/or a surgical intervention.

Childhood obesity prevention RCTs will be excluded. For the purpose of this review obesity prevention interventions are defined as the implementation of strategies to limit excess weight gain in samples that include healthy weight children or adolescents.

Types of comparator groups

Acceptable control groups will include no treatment/wait-list control, usual care, a lower dose or intensity of treatment (e.g. minimal advice, written education materials) or an alternative treatment.

Types of outcomes

Measures of outcome will include but not be limited to changes in:

- anthropometry, including BMI, age and/or sex standardized BMI measures (e.g. BMI z-score, BMI percentile), % overweight for age, waist measurement, or skinfolds;
- clinical indicators of weight changes (e.g. serum cholesterol, plasma insulin and glucose, or blood pressure);
- body composition, including % body fat or % lean body mass; or
- any measure related to diet, nutrition or eating. For example dietary intake, dietary behaviors, nutrition knowledge and attitudes, social cognitive theory constructs that relate to eating behaviors (e.g. eating intentions, self-efficacy in making food choices).

Types of studies

Given the large volume of RCTs identified by our previous reviews,[1,2] this review will only include RCTs published in the peer-reviewed literature.

Search strategy

The search strategy is based on the previous search strategy used in 2010,[2,31] and is shown in Appendix 1. The only deviation from the 2010 strategy will be that two databases searched in 2010 (shown with an asterisk) will be replaced with more relevant databases, as recommended by the Senior Research Librarian who will implement the literature search strategy. The databases that will be searched are: CINAHL, MEDLINE, PreMEDLINE, Cochrane Library (all databases), Embase, Informit Health Collection (instead of AUSTROM*), Dissertations and Theses, and Scopus (instead of Current Contents*). To identify additional eligible studies, we will also examine the reference lists of the most recent Cochrane review series, published between 2015 and 2017, on interventions for treating child and adolescent overweight and obesity.[25-30]

All citations identified through the search strategy will be imported into Covidence.[35] Initially two reviewers will use Covidence to independently screen studies for eligibility against the inclusion criteria, based on information contained in the title and abstract. Full texts of all potentially relevant articles will then be retrieved and uploaded to Covidence. Two reviewers will examine the full text articles through Covidence and will independently designate if the study meets the inclusion criteria. Conflicts in eligibility decisions will be resolved by a third reviewer.

Assessment of methodological quality

All studies that meet the inclusion criteria for this review will be independently assessed for methodological quality by two reviewers, using the JBI Critical Appraisal Checklist for RCTs.[36] We will modify item 11, so that item 11a will be “Were adiposity-related outcomes measured in a reliable way?” and item 11b will be “Were dietary outcomes measured in a reliable way?”. Responses will be recorded in a Microsoft Excel spreadsheet. Any disagreements that arise between the reviewers will be resolved

through discussion, or with a third reviewer. These assessments will be used to develop statements on the quality of the included studies with a clear indication of the risks of bias present.

Data extraction

Data will be extracted from studies included in the review using a standardized data extraction tool in the form of a Microsoft Excel spreadsheet. The tool will include all the items on the JBI Data Extraction Form for Experimental / Observational Studies[32] and additional items considered pertinent to the assessment of methodological quality and data synthesis. One reviewer will extract the required data and a second reviewer will check the first reviewer's extraction for accuracy and completeness. If there is disagreement between reviewers regarding the extracted data, a third reviewer will be consulted. If additional information about an included study is required then authors of the study will be contacted.

Data synthesis

Results of comparable RCTs will be pooled in a meta-analysis to determine the effectiveness of the intervention. Comparability of the studies will be defined by the population, interventions, comparator groups and outcome measures. Review Manager will be used to perform meta-analyes.[37] Chi square and visual interpretation of graphs will be used to assess heterogeneiety. Significant heterogeneity will be defined when the p value is less than 0.05. Odds ratio will be used to summarize effect for dichotomous data, while the weighted mean difference or standardized mean difference will be used for continuous data. Where statistical pooling is not possible the findings will be presented in narrative form including tables and figures to aid in data presentation where appropriate. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement will be used in preparation of the final report.[38] A GRADE 'Summary of Findings' table will be compiled following the guidance in the GRADE handbook.[39]

Conflicts of interest

None to declare.

Dr Alessandro Demaio is a staff member of the World Health Organization in Geneva. He alone is responsible for the views expressed in this publication and they do not necessarily represent the decisions or policies of any third party.

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316 **Appendix 1. Literature search strategies**

317

318 **Database(s): Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R)**
319 **Daily and Ovid MEDLINE(R)**

#	Searches
1	*Obesity/dh, dt, pc, rh, su, th [Diet Therapy, Drug Therapy, Prevention & Control, Rehabilitation, Surgery, Therapy]
2	intervention.mp.
3	weight control.mp.
4	weight management.mp.
5	weight loss.mp.
6	healthy weight.mp.
7	(family or parent* or school).mp.
8	weight reduction program*.mp.
9	(dietitian* or dietician*).mp.
10	2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
11	(child or children or adolescen*).mp.
12	1 and 10 and 11
13	limit 12 to english language
14	**limit 13 to ed=20100907-present**

320

321

322

323 **Database(s): Embase Classic+Embase**

#	Searches
1	*obesity/dt, pc, rh, su, th, dm [Drug Therapy, Prevention, Rehabilitation, Surgery, Therapy, Disease Management]
2	intervention.mp.
3	weight control.mp.
4	weight management.mp.

5	weight loss.mp.
6	healthy weight.mp.
7	(family or parent* or school).mp.
8	weight reduction program*.mp.
9	(dietitian* or dietician*).mp.
10	2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
11	(child or children or adolescen*).mp.
12	1 and 10 and 11
13	limit 12 to english language
14	**limit 13 to dd=20100907-present**

CINAHL

#	Query
S1	(MH "Obesity/TH/RH/SU/DH/DE/PC")
S2	intervention
S3	weight control
S4	weight management
S5	weight loss
S6	healthy weight
S7	(family or parent* or school)
S8	weight reduction program*
S9	(dietitian* or dietician*)
S10	S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9
S11	(child or children or adolescen*)
S12	S1 AND S10 AND S11 (limited to English and September 2010+)

Dissertations and Theses

ti(obes*) AND ti(child* OR adolesc*) AND ti(dieti* OR intervention OR treatment OR weight control OR weight management OR weight loss OR healthy weight OR weight reduction program*). Limited to English and 2010+

Cochrane Library

ID	Search
#1	MeSH descriptor: [Obesity] explode all trees and with qualifier(s): [Diet therapy - DH, Drug therapy - DT, Prevention & control - PC, Rehabilitation - RH, Surgery - SU, Therapy - TH] 6483
#2	intervention
#3	weight control
#4	weight management
#5	weight loss
#6	healthy weight
#7	(family or parent* or school)
#8	weight reduction program*
#9	(dietitian* or dietician*)
#10	{or #2-#9}
#11	child or children or adolescen*
#12	**{and #1, #10-#11} Publication Year from 2010**

Informit Health Collection

obes* AND (child* OR adolescen*) AND (dietitian* OR dietician* OR intervention OR "weight control" OR "weight management" OR "weight loss" or "healthy weight" OR family OR parent* OR school OR "weight reduction program*")

Limited to 2010-

Scopus

(TITLE (obes*) AND TITLE (child* OR adolescen*) AND TITLE (dietitian* OR dietician* OR intervention OR "weight control" OR "weight management" OR "weight loss" OR "healthy weight" OR family OR parent* OR school OR "weight reduction program*")) AND PUBYEAR > 2009 AND (LIMIT-TO (LANGUAGE , "English"))